CORRESPONDENCE/MEMORANDUM

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TO: Mike Donofrio
Heidmann (Bolt) Lake File

FROM: Steve Hogler
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SUBJECT: 2016 Heidmann (Bolt) Lake Fish Survey

Heidmann (Bolt) Lake (WBIC-85200) is a 24 acre lake located in southwestern Kewaunee County (WDNR 2001). The lake has a maximum depth of 34 feet, an average depth of 14 feet and is located in an agricultural watershed. There is low density residential development on the eastern side of the lake and access is through a small County Park on the southern shore. The lake is managed as a bass-panfish lake and has had a history since the 1970's of small to moderate winterkills caused by low dissolved oxygen levels.

The fishery of Heidmann Lake historically has alternated between a desirable mix of Northern Pike, Largemouth Bass and panfish to one dominated by panfish. Surveys conducted in the 1950's and 1960's found that fish populations were dominated by large Northern Pike up to 40" in length and high numbers of Largemouth Bass (Wiegert 1962). Most panfish were noted to be in the 6" to 8" size range. Most surveys conducted in the 1970's were in response to winterkills (Kernen 1971 and 1973, Langhurst 1976). These surveys found low numbers of gamefish and moderate numbers of small panfish in the 4" to 6" size range. Following these 1970's fish kills, the lake was restocked with Largemouth Bass and Northern Pike. Surveys conducted in the 1980's found that Largemouth Bass and Bluegill populations had improved with multiple sizes and age classes captured (Welch 1982, Lychwick 1985). However, it was found that the Northern Pike population was very low during each survey.

In 1995 Heidmann Lake was part of a WDNR/ UW-Madison Littoral Zone project that used a deep cutting plant harvester to cut lanes in dense stands of aquatic plants in lakes which bluegill growth rates were less than average. The goal of this project was to increase predation on small panfish by bass to reduce overall panfish numbers to increase panfish size. Results from this study were inconclusive for Heidmann Lake.

2016 Survey Methods and Results:

Following Wisconsin lake sampling protocols, Heidmann Lake was surveyed during the evening of May 31, 2016 to assess the lake's fish population. During the 0.6 hours of electrofishing, the entire 0.9 mile shoreline was surveyed and an attempt was made to net all observed fish. All landed fish were identified, measured to the nearest millimeter and then were released. For age analysis, spines were collected from Largemouth Bass and scales from Bluegill before these species were released.

During the 0.6 hours of shocking we captured 125 individual fish representing six species. Total CPE was 200 fish per hour or 138.9 fish per mile shocked. Largemouth Bass dominated the catch followed by Bluegill with fewer fish of other species captured (Table 1).

Table 1. Abundance and CPE of fish captured during 2016 spring electrofishing on Heidmann (Bolt) Lake.

Species	Number	CPE (Fish/ HR)	CPE (Fish/Mile)	Average Length (mm)	Size Range (mm)
Largemouth Bass	55	88	61.1	263 mm (10.4")	165-412 mm (6.5" to 16.2")
Bluegill	46	73.6	51.1	131 mm (5.2")	54-202 mm (2.1" to 8")
Yellow Perch	1	1.6	1.1	120 mm (4.8")	120 mm (4.8")
Green Sunfish	15	24	16.7	143 mm (5.6")	90-175 mm (3.5" to 6.9")
Black Crappie	1	1.6	1.1	246 mm (9.7")	246 mm (9.7")
Yellow Bullhead	7	11.2	7.8	271 mm (10.7")	230-320 mm (9.1" to 12.6")
Total	125	200	138.9		

Gamefish

Largemouth Bass were the only gamefish captured during this survey (Table 1). The 55 measured bass ranged in length from 165 mm to 412 mm (6.5" to 16.2") and had an average length of 263 mm (10.4") (Table 2). Only two of the fifty-five bass (3.6%) captured were longer than the 356 mm (14") minimum harvest size limit imposed on anglers.

Dorsal spine samples were collected from all captured bass to estimate age. Analysis of the spines indicated that in our sample, captured bass ranged from two to eight years of age (Table 3). Most bass were either age 3, 4 or 5, with fewer bass in the other age categories. Comparison to statewide length at age information found on the state fish database indicates that at ages 2 and 3, bass collected during this survey were longer at each age than an average bass across Wisconsin, however, by age 4 and older, their growth was below state averages (Table 4). Since there were only single fish aged at age and age 8, growth information should be viewed cautiously.

Panfish

Bluegill were the most abundant panfish captured during this survey (Table 1). The 46 Bluegill ranged in length from 54 mm to 202 mm (2.1" to 8") and had an average length of 131 mm (5.2") (Table 2). 33% of the captured Bluegill were greater than 150 mm (6") in length but only 1 of 46 (2.2%) was greater than 200 mm (8") in length.

Scales were collected from a subsample of Bluegill to estimate age. Ages 1 through 6 were identified in our sample with age 3 the most common with other ages less common (Table 5). Age 3 Bluegill averaged 141 mm in length. When compared to State age at length tables, Bluegill in Heidmann Lake were slightly longer at each age than Bluegill from other lakes across Wisconsin (Table 4).

Black Crappie and Green Sunfish were also captured during electrofishing (Table 1). The fifteen Green Sunfish ranged in length from 90 mm to 175 mm (3.5" to 6.9") and had an average length of 143 mm (5.6") (Table 2). The single Black Crappie was 246 mm (9.7") in length.

Other Species

In addition to the gamefish and panfish captured during the survey, we captured seven Yellow Bullhead. The Yellow Bullhead ranged in length from 230 mm to 320 mm (9.1" to 12.6") and had an average length of 271 mm (10.7") (Table 2).

Table 2. The length frequency of fish captured from Heidmann (Bolt) Lake during the May 2016 survey.

Length (in) mm	Largemouth Bass	Northern Pike	Yellow Perch	Bluegill	Pumpkin-seed Sunfish	Black Bullhead	Yellow Bullhead	Black Crappie
(3") 70				1				
80			4					
90			2					
(4") 100			2		1			
110				1				
120								
130				1				
140			1					
(6") 150			1	1				
160			2					
170			1					
180			1					
190			3					
(8") 200			2	1				
210			2					
220			5					
230			5					
240			4					
(10") 250						1		
260			1					
270							1	
280								
290								1
(12") 300			1					6
310								2
320	1							
330	1							
340	4							
(14") 350	3							
360	8							
370	4							
380	6							
390								
(16") 400	2							
410		1						
420								
430								
440								
(18") 450		1						
460								
470								
480		1						
490								
(20") 500								
510								
520								
(21") 530		1						
Total	29	4	37	5	1	1	1	9
Ave. Length	367 (14.4")	473 (18.6")	189 (7.4")	136 (5.4")	106 (4.2")	259 (10.2")	270 (10.6")	305 (12")
S.D.	18.4	52.0	59.9	48.1	--	--	--	5.0

Table 3. The distribution of age of Largemouth Bass captured from Heidmann (Bolt) Lake, 2016.

Length (in) mm	Largemouth Bass	Age							
		1	2	3	4	5	6	7	8
(6") 150									
160	1		1						
170	2		2						
180									
190	2		2						
(8") 200	3		3						
210	4		1	3					
220	3			2	1				
230	7			3	4				
240	5			2	3				
(10") 250	3			2	1				
260	2			1	1				
270	2				1	1			
280	3				1	1	1		
290	4				1	3			
(12") 300	2					2			
310	3						3		
320	3					2	1		
330	2					2			
340	1					1			
(14") 350	1					1			
360									
370	1							1	
380									
390									
(16") 400									
410	1								1
Total	55		9	13	13	13	5	1	1
Ave. Length	263		192 (7.6")	235 (9.3")	251 (10")	312 (12.3")	311 (12.3")	377 (14.8")	412 (16.2")
S.D.	53.6		17.8	14.4	21.4	24.6	13.9	--	--

Table 4. Comparison of statewide length at age averages to those of Heidmann (Bolt) Lake for Largemouth Bass and Bluegill captured during the May 2016 survey. Lengths are in mm and inches (in).

Species		AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8	AGE 9
Largemouth Bass	2016	--	192 (7.6")	237 (9.3")	250 (10")	312 (12.3")	311 (12.3")	377 (14.8")	412 (16.2")	
	State Average	97 (3.8")	165 (6.5")	229 (9")	290 (11.4")	338 (13.3")	384 (15.1")	414 (16.3")	447 (17.6")	454 17.9")
Bluegill	2016	69 (2.7")	98 (3.8")	141 (5.7")	163 (6.4")	186 (7.3")	203 (8")	--	--	--
	State Average	64 (2.5")	97 (3.8")	122 (4.8")	147 (5.8")	167 (6.6")	183 (7.2")	196 (7.7")	--	--

Table 5. The distribution of age of Bluegill captured from Heidmann (Bolt) Lake, 2016.

Length (mm)	Age						
	Bluegill	1	2	3	4	5	6
(2") 50	2	2					
60							
70	2	2					
80	6	1	5				
90	3		3				
(4") 100	1		1				
110	3		2	1			
120	2			2			
130	3		1	2			
140	7			7			
(6") 150	6			3	3		
160	4				4		
170	2				2		
180	4					4	
190							
(8") 200	1						1
Total	46	5	12	15	9	4	1
Ave. Length	131 (5.2")	69 (2.7")	98 (3,8")	141 (5.7")	163 (6.4")	186 (7.3")	202 (8")
S.D.	38.2	11.6	16.6	11.3	8.3	4.3	--

Discussion and Conclusions:

The Largemouth Bass population appears to be doing well with many age and size classes present in our sample. Growth based on length at age comparisons with state averages indicate that bass are growing at or above state rates through age 3 then below average from age 4 and older. Few bass longer than the minimum size limit for harvest (14") were captured which could indicate slow growth caused by limited forage or that anglers quickly harvest legal size fish.

The lack of Northern Pike in our catch was unexpected. Past surveys captured good numbers of pike with a few very large fish mixed in. It is likely that over time, angler harvest or the loss spawning habitat caused a sharp decline in the pike population.

Panfish numbers were also lower than expected based on past surveys of this water. In 2016 Bluegill dominated our panfish catch. Length at age for Bluegill was above state averages in 2016 unlike during surveys in the 1970's in which growth rates were below state averages. Likely predation by bass and angler harvest has reduced Bluegill numbers resulting in improved growth rates. Other panfish such as Yellow Perch, Black Crappie and Green Sunfish were captured in lower abundances.

It is recommended to continue to monitor the Largemouth Bass population of the lake and if warranted in the future, modify bass regulations to increase harvest of smaller fish if bass growth rates continue to decline.

References:

Kernen, L. 1971. The 1969-1970 Winterkill and Boomshocker Survey Report. Wisconsin Department of Natural Resources. Madison, WI. 9 pages.

Kernen, L. 1973. Boomshocker Survey Report. Wisconsin Department of Natural Resources. Madison, WI. 3 pages.

Langhurst, R. 1976. Bolt Lake Survey Report. Unpublished. Wisconsin Department of Natural Resources. Madison, WI. 3 pages.

Lychwick, T. 1985. Bolt Lake Survey Report. Unpublished. Wisconsin Department of Natural Resources. Madison, WI. 11 pages.

Welch, D. 1986. Bolt Lake, Kewaunee County Electrofishing Survey Report. Unpublished. Wisconsin Department of Natural Resources. Madison, WI. 2 pages.

Wiegert, L. 1962. Heidmann Lake Survey Report. Unpublished. Wisconsin Conservation Department. Madison, WI. 6 pages.

WDNR. 2001. The State of the Lakeshore Basin Appendices. Wisconsin Department of Natural Resources, Publication WT 667A 2001. Madison WI. 60 pages.